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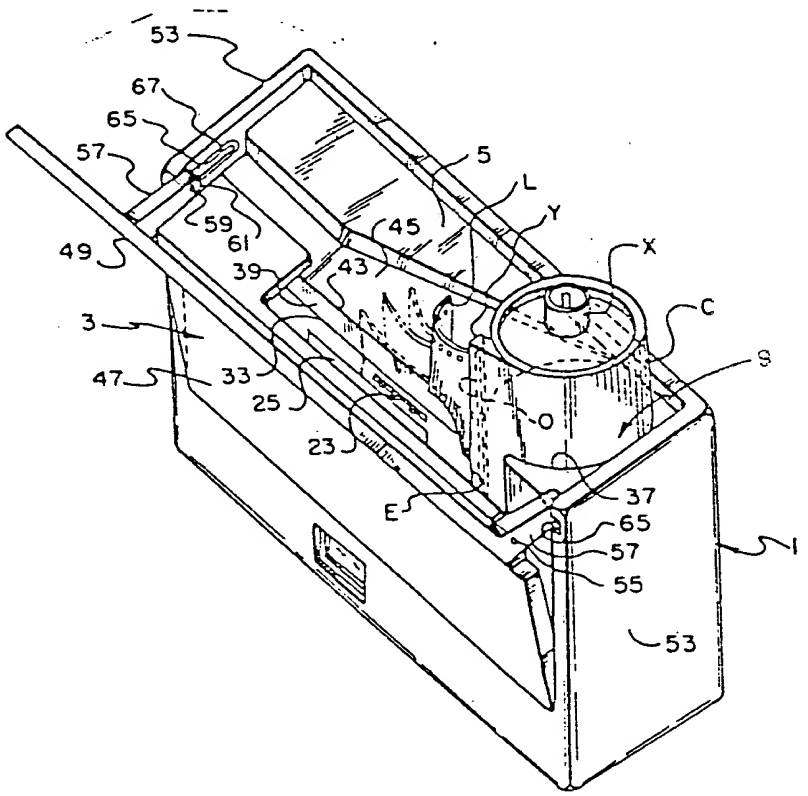
(57) Abstract

A bottom loading still camera of the 35mm type has an inclined edge (43) with a rounded corner (41) which engages the edge of a curled leader on a film to straighten the leader and guide it, longitudinal edge first to the film support surface of the camera as the film container for the film is inserted, end first into the camera.



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BOTTOM LOADING CAMERA

The present invention generally relates to a bottom loading still camera adapted to receive a film container of the type supporting film having a leader extending from the container. More particularly, the invention relates to such a camera having a film loading apparatus for properly positioning the film leader as the film container is inserted end first in the camera.

In loading a bottom-loaded 35mm camera, such as the Leica M5 camera, a film container is first inserted end first, i.e., axially, slightly into a film supply chamber, opened at the bottom of the camera by removing a baseplate. Just enough film leader to reach an automatic take-up spool in a film take-up chamber of the camera is drawn out of a light-tight opening in the film container. Then, the drawn leader, which is normally curled, is held straight and inserted edgewise, i.e., longitudinal edge first, into a guide slot connecting the supply and take-up chambers. At the same time, insertion of the film container into the supply chamber is completed and the forward end of the drawn leader is positioned in the take-up chamber for engagement with the take-up spool.

Such film loading procedures are troublesome and require a certain amount of manual dexterity, expecially if the camera is hand held during loading. A film container that simplifies the loading procedure is disclosed in U. S. Patent No. 2,592,158, issued April 8, 1952 to Kirby et al. In that patent, a film container is provided with a telescoping U-shaped wire frame, which is nested in a groove to support the normally curled film leader in a straight line. In operation, the wire frame is

pulled out with the film leader. Then, as the film container is inserted in the supply chamber of a camera, the straightened leader is guided by the wire frame into a film slot, connected with the supply chamber. At the same time, the wire frame contacts an inner wall of the supply chamber and is pushed back into the groove. While this container eliminates the step in the film loading procedure of manually holding the curled leader straight for insertion into a film slot, it requires a more complicated film container.

It is the object of the invention to provide a camera generally of the bottom loading type described but in which insertion of a film container with a curled leader is accomplishable without great manual dexterity or a complicated film container.

This object is accomplished by the camera including an elongated engaging structure positioned to engage progressive portions of a longitudinal edge of a film leader to uncurl the leader progressively toward its leading end as the container is inserted in the film supply chamber.

According to a preferred embodiment, the elongated engaging structure is an edge of a surface which surface is substantially parallel to the normal film support surface of the camera and guides the film to that support surface.

Preferably, this edge is inclined toward the film path of the camera from a rounded corner adjacent the film supply chamber to a position adjacent the film take-up chamber.

Fig. 1 is a rear perspective view of a photographic camera of the type in which the invention may be used;

Fig. 2 is a bottom perspective view of the camera, opened to show loading apparatus in

accordance with a preferred embodiment of the invention;

Fig. 3 is a back elevation view of the opened camera, depicting an initial state of film loading;

Fig. 4 is a bottom plan view of the opened camera, depicting the same state of film loading as in Fig. 3;

Figs. 5 and 6 are back elevation and plan views, respectively, depicting an intermediate state of film loading;

Fig. 7 is a back elevation view of the opened camera, depicting the final state of film loading;

Fig. 8 is a partial side elevation view of the camera, showing a cover door opened to a partially opened position for film loading; and

Fig. 9 is a partial side elevation view of the camera, showing the cover door opened to a fully opened position.

The present invention is described as being embodied in a relatively simple 35mm camera. Because such cameras are well known, this description is directed in particular to elements forming part of or cooperating directly with the preferred embodiment. It is to be understood, however, that other elements not shown or described may take various forms known or obvious to one having ordinary skill in the design of cameras.

Referring now to the drawings, and in particular to Figs. 1 and 2, there is shown a bottom-loaded 35mm camera for receiving a conventional film container C. The film container C, as is known, includes a rotatably mounted core member X, which supports a coiled 35mm film within the film container. The film has a normally curled leader L

extending out of a light-tight opening O in a lipped portion Y of the film container C. The camera preferably comprises a camera body 1 and a compound or multi-element articulated cover door 3. The cover door 3 can be partially opened to uncover a bottom portion 5 of the camera body 1.

The camera body 1, as shown in Fig. 3 with the cover door omitted for the sake of clarity, includes a back portion 7. A supply chamber 9 in the camera body 1 is shaped to receive and hold the film container C. Known means, such as a spindle 11, urged by a spring 15 into the supply chamber 9 from a cavity 17, rotatably supports the core member X of the film container C during film advance and film rewind in the camera. The spindle 11 is split to engage a cross-rib, not shown, of the core member X, within a well at one end 19 of the film container C. A slot-like extension 21 of the supply chamber 9 is shaped to hold the lipped portion Y of the film container C to prevent rotation of the film container as the film is advanced from the container or wound back into the container. Film advance and film rewind may be accomplished using known drive mechanisms and, in this connection, there is illustrated in Fig. 3, a sprocket wheel 23 for engaging and advancing the film. As is customary, film advance is from the slot-like extension 21 of the supply chamber 9, across a film gate 25, and onto a take-up spool 27, rotatably mounted within a take-up chamber 29 in the camera body 1. The take-up spool 27 includes a circular array of radially extending lugs 31 for automatically engaging a hole H in the film leader L. Two parallel beveled surfaces 33 and 35 or other suitable means, border a film passageway P in Fig. 3, for guiding film between the slot-like extension 21 and the take-up chamber 29.

The film moves along film passageway P on a film support surface or surfaces 99 which may include conventional guide rails.

In Figs. 3 and 4, it can be seen that the supply chamber 9 is only accessible for container-loading from one end, at the bottom portion 5 of the camera body 1, through an entrance opening 37 to the supply chamber. The entrance opening 37 is uncovered by partially opening the cover door 3, as shown in Figs. 2 and 4. This permits the film container C to be inserted axially, i.e., by the end 19 first in Fig. 3, through the entrance opening 37 into the supply chamber 9. The film passageway P is accessible for leader-loading at the bottom portion 5 of the camera body 1, along a flat guide surface 39 extending parallel to the film passageway. As the film container C is inserted axially into the supply chamber 9, the flat guide surface 39 supports the film leader L, which moves edgewise, i.e., longitudinal edge first, into the film passageway P.

In prior art cameras, the film leader L, which is normally curled, was manually held straight and inserted edgewise into a guide slot as the film container C was loaded in the camera. This required some degree of manual dexterity, and could be difficult, expecially if the camera is hand-held during loading. According to the invention, there is provided means for uncurling the film leader L as the film container C is inserted into the supply chamber 9. When the end 19 of the film container C is moved through the entrance opening 37 into the supply chamber 9, as shown in Fig. 3, a longitudinal edge portion E of the film leader L, proximate the container opening O, is pushed against a quarter-round corner 41, adjacent the slot-like extension 21 of the supply chamber. The rounded

corner 41, as shown in Fig. 4, directs the longitudinal edge portion E onto an inclined straight edge 43, formed by the juncture of the flat guide surface 39 and an inclined plane 45. The straight edge 43 is an elongated engaging structure which deflects successive longitudinal edge portions, for example E' and E'' in Fig. 5, of the film leader L into a substantially straight line, to incrementally uncurl the film leader, as those edge portions are pushed across the straight edge 43 by insertion of the film container C into the supply chamber 9. The straight edge 43 then deflects the respective straightened edge portions of the film leader L onto the flat surface 39. The flat surface 39, in turn, acts as a support which prevents the film leader from re-curling and guides the uncurled leader, straightened edge portions first, onto the film support surfaces 99.

As shown in Fig. 5, the straight edge 43 is inclined toward the support surfaces 99 from the supply chamber 9, to make an angle A with successive longitudinal edge portions, for example, E' and E'', of the film leader L as the film container C is inserted into the supply chamber. Orientation of the straight edge in this manner with respect to successive longitudinal edge portions of the film leader, facilitates uncurling and minimizes any chance of a snag. The plane 45, over which the film leader L moves to uncurl, as shown in Fig. 6, is inclined in conformity with the straight edge 43 and is relieved from the remainder of the bottom portion 5 of the camera body 1 in order to provide sufficient room for the film leader to uncurl without affecting the straightening action occurring along the straight edge.

When the film container C is completely

inserted in the supply chamber 9, as shown in Fig. 7, the uncurled leader L comes to rest on the film support surfaces 99 between the beveled guide surfaces 33 and 35 and is positioned for engagement with the sprocket wheel 23. Means, not shown, are provided on the inside of the cover door 3 for holding the uncurled leader L against the sprocket wheel 23 upon closing the cover door. Rotation of the sprocket wheel 23 and the take-up spool 27, for advancing the first exposure area of the film into alignment with the film gate 25, may be initiated automatically by closing the cover door 3 or manually by depressing a button, not shown, on the camera body 1.

The cover door 3, as shown in Figs. 1 and 8, comprises a back door 47 and a bottom door 49. The back door 47 is supported for pivotal opening and closing movement on a first axis, aligned with a first pair of pivot pins 51 connecting the back door with opposite sides 53 of the camera body 1. The bottom door 49 is supported for pivotal opening and closing movement on a second axis, aligned with a second pair of pivot pins 55 connecting respective arm-like extensions 57 of the bottom door with the back door 47 at intermediate locations on the arm-like extensions. The second axis, defined by the two pins 55, extends parallel to the first axis, defined by the two pins 51. A pair of follower pins 59 project from respective end portions 61 of the two arm-like extensions 57 into a pair of cam or motion-imparting slots 63, formed in the opposite sides 53 of the camera body 1. The follower pins 59 are constrained by the cam slots 63 to translational and pivotal movements within the cam slots. With such an arrangement, the cover door 3 may be opened from a closed position to a partially opened position

(for film loading) simply by pivoting the bottom door 49 open on the pivot pins 55, as shown in Fig. 8. Opening the bottom door 49, pivots the arm-like extensions 57 of the bottom door about pivot pins 55. At the same time, the follower pins 59 on the arm-like extensions 57 translate and pivot in the cam slots 63. This causes the arm-like extensions 57 to urge the back door 47 to pivot open on the pivot pins 51. Accordingly, opening the bottom door 49 to the partially opened position, shown in Fig. 8, causes a partial opening of the back door 47. And conversely, as can be appreciated from Fig. 8, closing the bottom door 49 from the partially opened position, will cause a closing of the back door 47.

The two cam slots 63 open into respective pin-exit slots 65, formed in the opposite sides 53 of the camera body 1. When the cover door 3 is in the partially opened position, as shown in Fig. 8, a pair of resilient pin-retaining members 67 in the respective pin-exit slots 65 ordinarily prevent the two follower pins 59 from moving out of the respective cam slots 63 into the pin-exit slots. The follower pins 59 are blocked by the pin-retaining members 67 at individual locations overcenter of the pivot pins 55, which maintains the cover door 3 in the partially opened position. To open the cover door 3 from the partially opened position to a fully opened position, as shown in Fig. 9, the bottom door 49 is pivoted open on the pivot pins 55 until the follower pins 59 flex the pin-retaining members 67 aside and move into the pin-exit slots 65. At this time, an interior edge 69 of the bottom door 49 bears against the back door 47, which prevents the bottom door from pivoting open farther on the pivot pins 55. However, the bottom door 49 can then be pivoted open in unison with the back door 47 on the pivot

pins 51. Pivoting the bottom door 49 open with the back door 47 on the pivot pins 51, removes the follower pins 59 from the pin-exit slots 65, permitting both doors 3 to be opened to the fully opened position.

When the cover door 3 is in the partially opened position, as shown in Figs. 2 and 8, the back door 47 shields the camera interior by substantially covering the back portion 7 of the camera body 1, and the bottom door 49 uncovers the bottom portion 5 of the camera body to allow limited access to the camera interior for film loading. Conversely, the cover door 3 in the fully opened position, as shown in Fig. 9, allows much greater access to the camera interior by uncovering the back portion 7 of the camera body. Accordingly, on the one hand, the cover door 3 in the partially opened position substantially shields the camera interior during film loading from foreign particles, fingerprints, and tampering with an interior mechanism. And on the other hand, the cover door in the fully opened position allows access to the camera interior should it become necessary, for example, to clear a film jam in the camera or to repair or clean an interior mechanism.

A spring-urged pressure plate 71, shown in Fig. 4, is mounted on the inside of the back door 47. When the cover door 3 is in the closed postion, the pressure plate 71 is located adjacent the film passageway P to hold a section of film from the film container C against the film gate 25 during picture-taking. However, the pressure plate 71 is moved with the cover door 3 to the partially opened position, in Fig. 4, away from the film passageway P, to provide space for moving the film leader L into the film passageway P as the film container C is inserted into the supply chamber 9. Means, not

shown, is located on the inside of the bottom door 49 for lightly depressing the film container C and the core member X, to assure their proper positioning in the supply chamber 9, as the cover door 3 is closed from the partially opened position.

The invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention. For example, the elongated engaging structure could also be a wire or leaf spring secured to the bottom wall of the camera adjacent the take-up chamber and inclined away from the film path toward the supply chamber. Such a structure could then extend outside of the camera when in use and be compressible against the bottom of the camera when the bottom door is closed. Compared to the embodiment shown in the Figs., it would have the advantages of adjustability and compactness when not in use but the disadvantages of more complexity and risk of damage.

I Claim:

1. A camera having a film supply chamber (9) for receiving a generally cylindrical film container of the type containing film having a curled leader extending from the container, the film supply chamber (9) having an open end through which the container can be inserted end first, and

film support surface or surfaces (99) extending from the supply chamber (9) to a film take-up chamber (29) on which surface the film is movable as it is advanced in the camera,

characterized by an elongated engaging structure (43) positioned and shaped to engage progressive portions of a longitudinal edge of a film leader to uncurl the leader progressively toward the leading end of the leader as the container is inserted in the film supply chamber (9).

2. The camera according to claim 1, wherein the elongated engaging structure is an edge (43) of a guide surface (39) which surface is substantially parallel to the film support surface (99) and is positioned to guide the leader onto the film support surface (99) as the container is inserted in the film supply chamber (9).

3. The camera according to claim 1 or claim 2, wherein the elongated engaging structure (43) is inclined toward the film support surface (99) from a position adjacent the film supply chamber (9) to a position adjacent the film take-up chamber (29).

4. The camera according to claim 2 or claim 3 as dependent on claim 2, wherein the edge of the guide surface (43) terminates in a rounded corner (41) adjacent the film supply chamber (9).

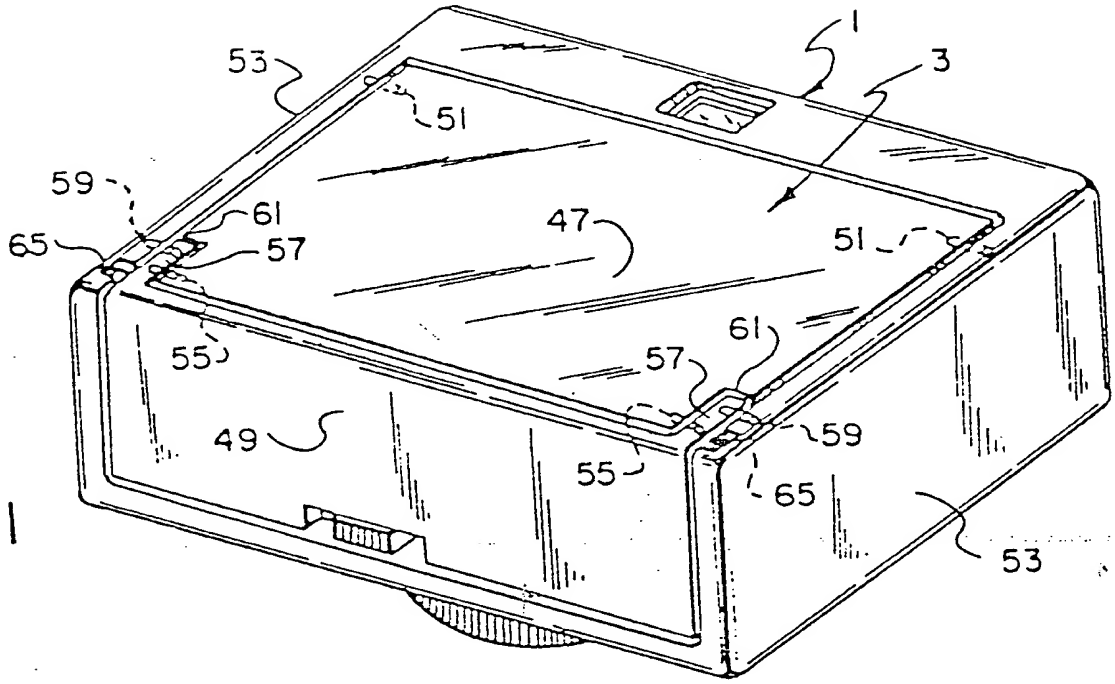

FIG. 1

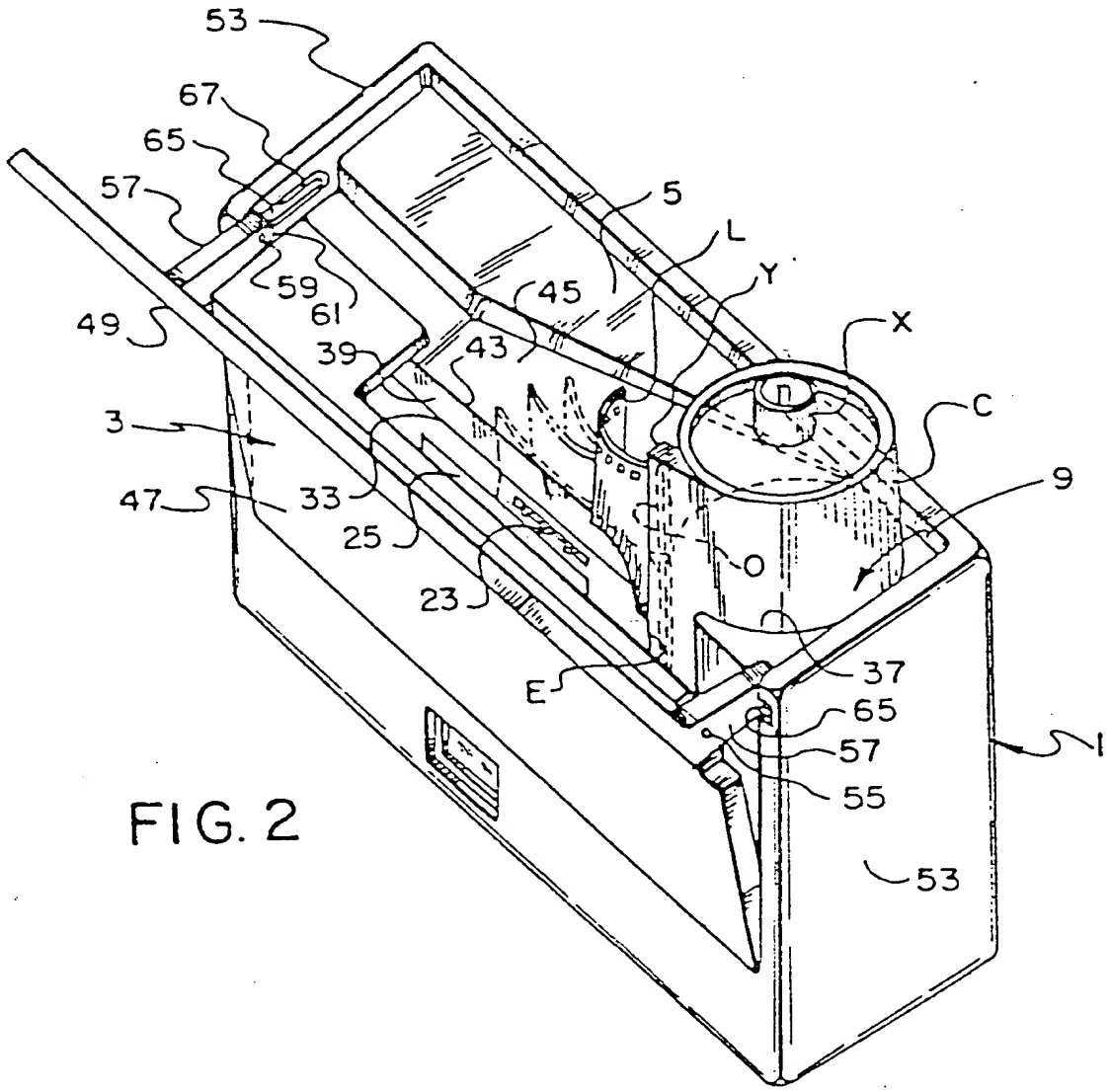

FIG. 2

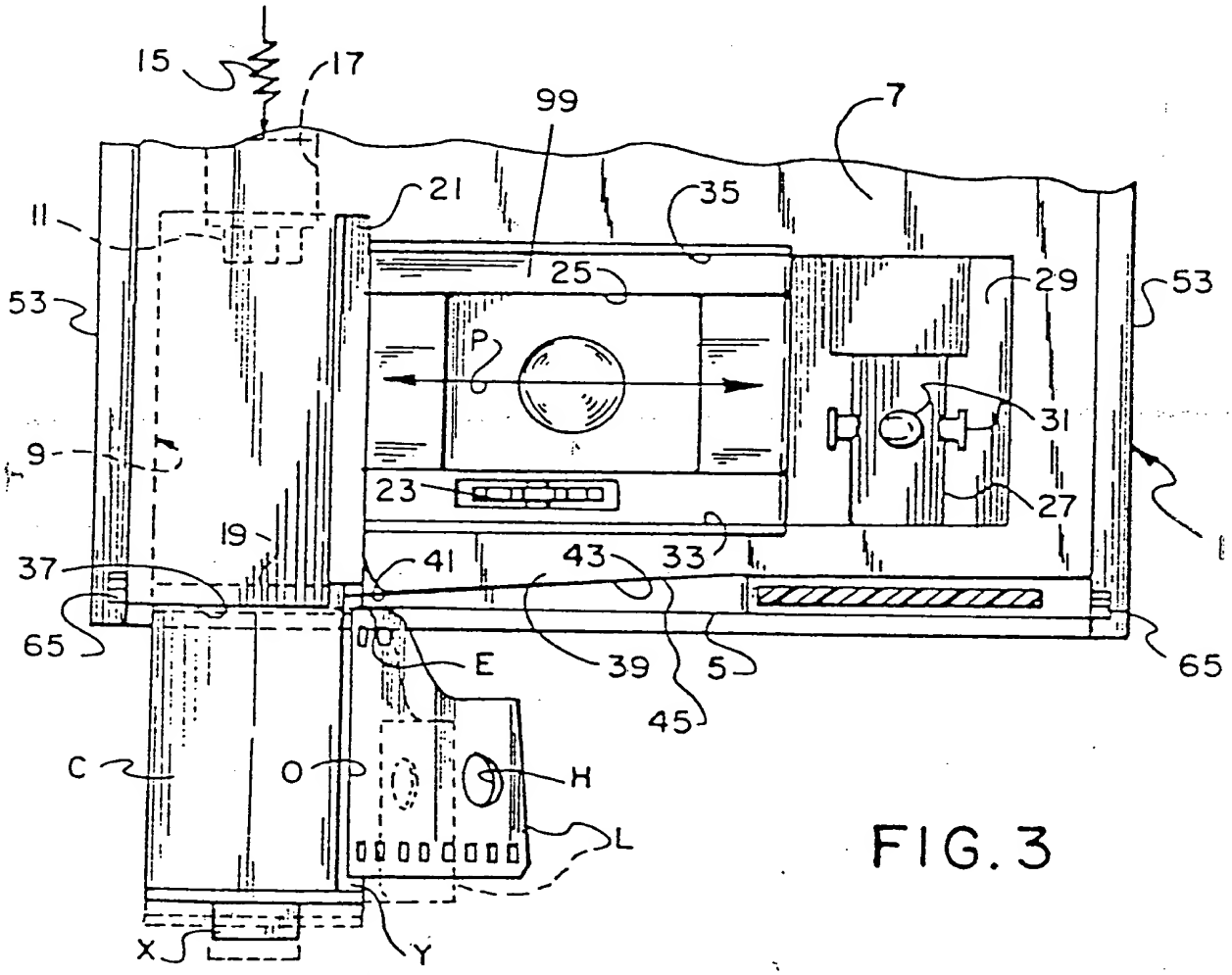

FIG. 3

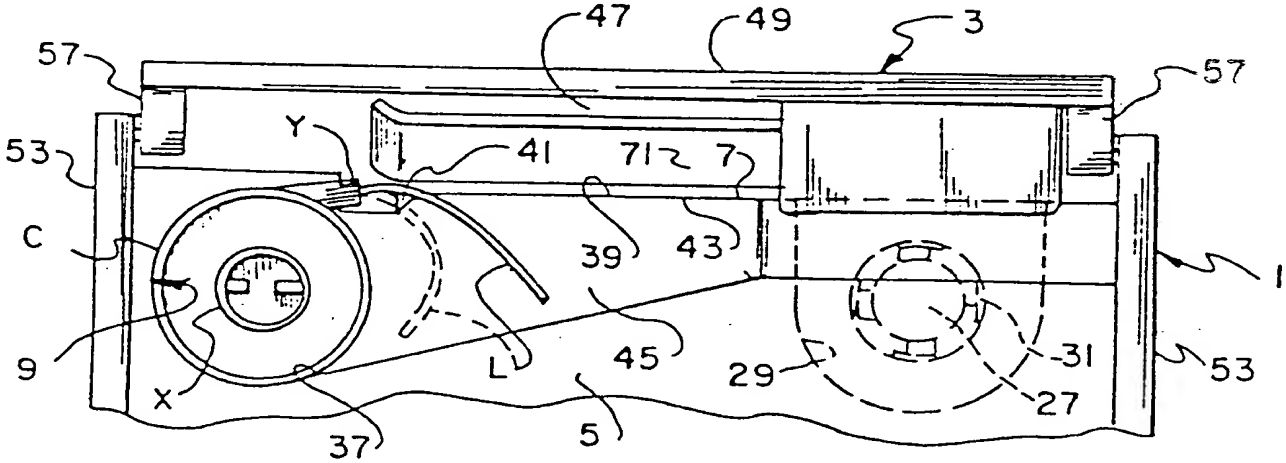

FIG. 4

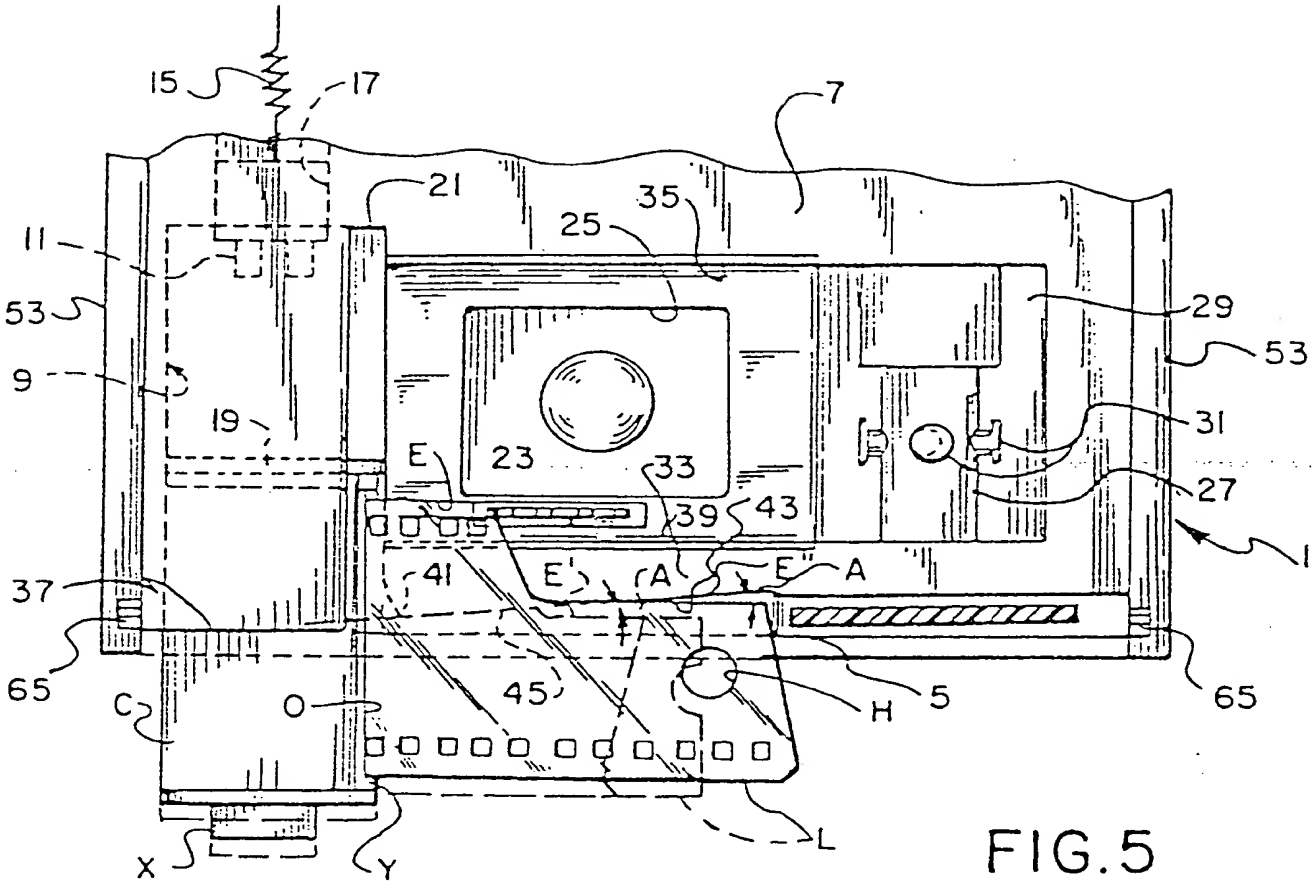

FIG.5

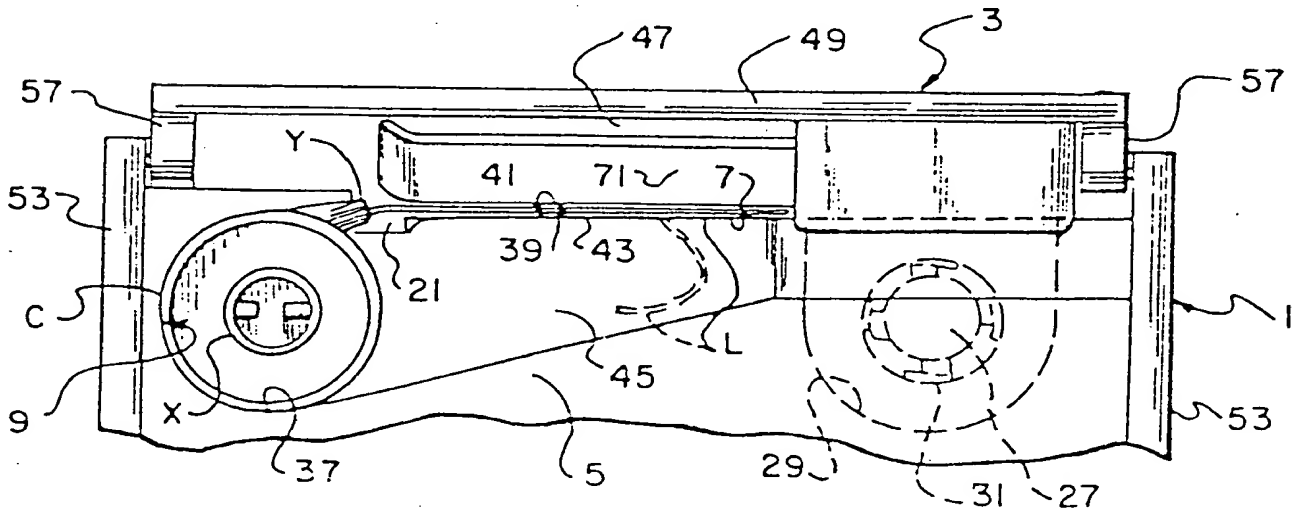

FIG.6

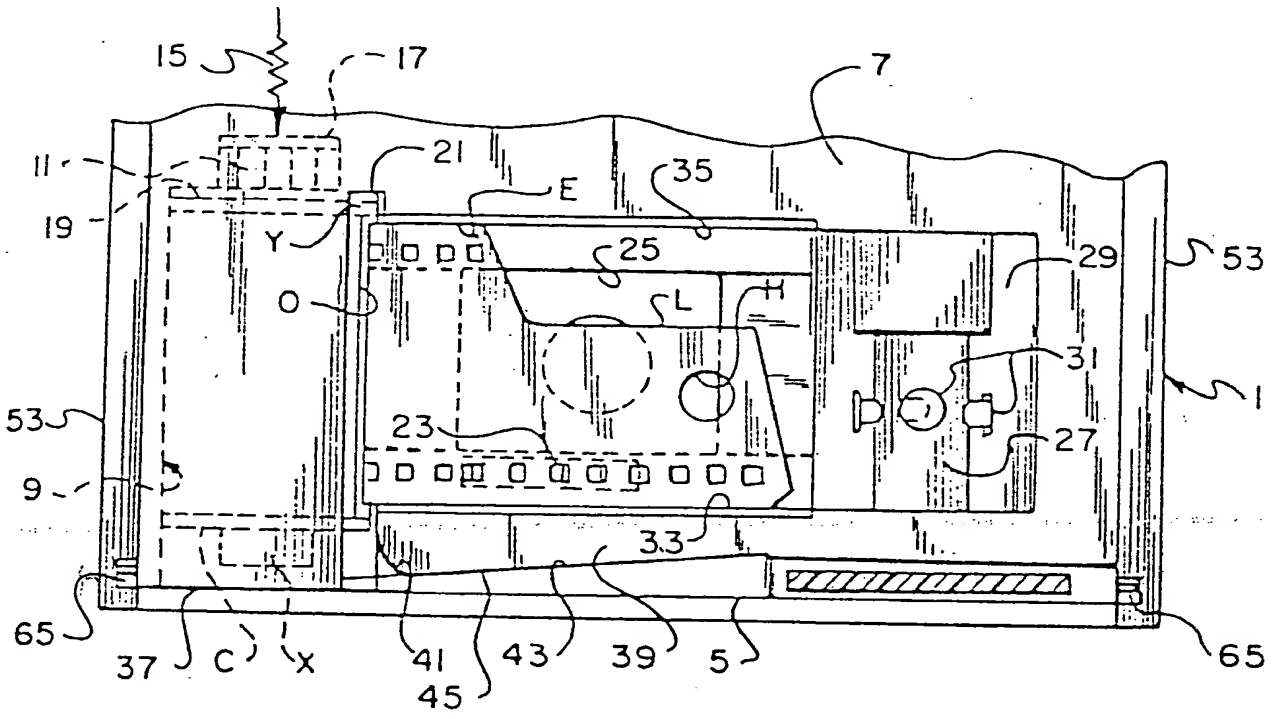

FIG. 7

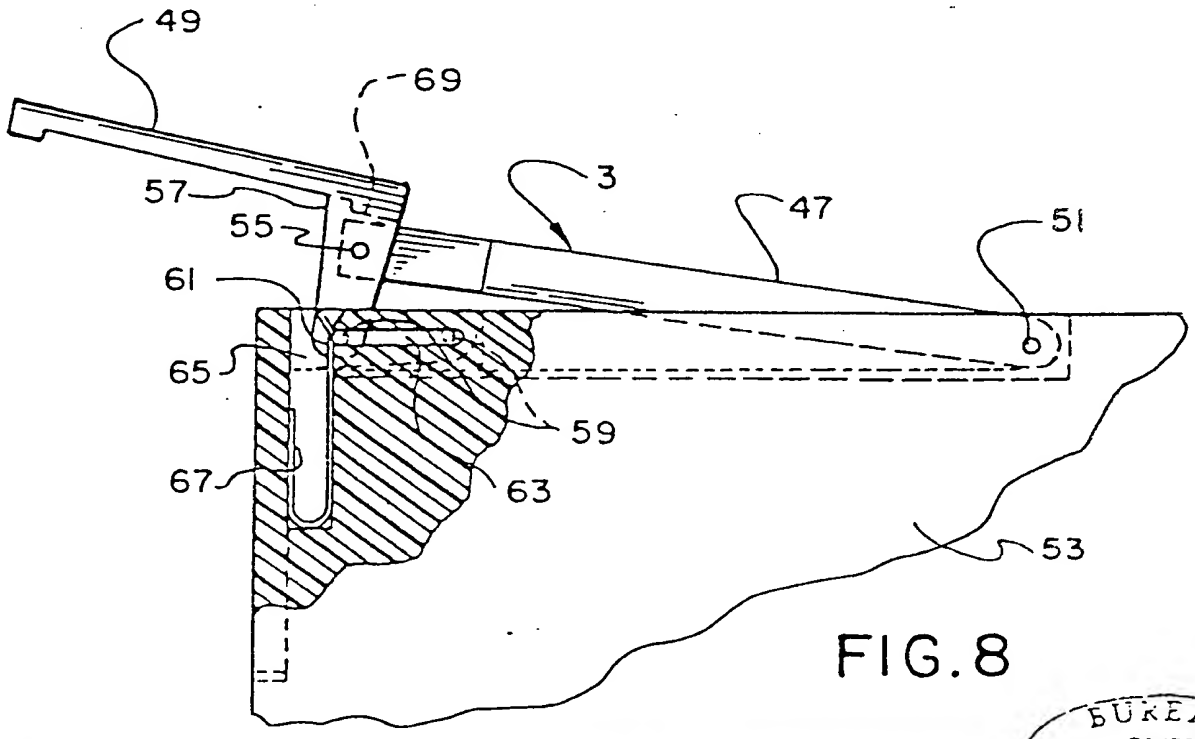

FIG. 8

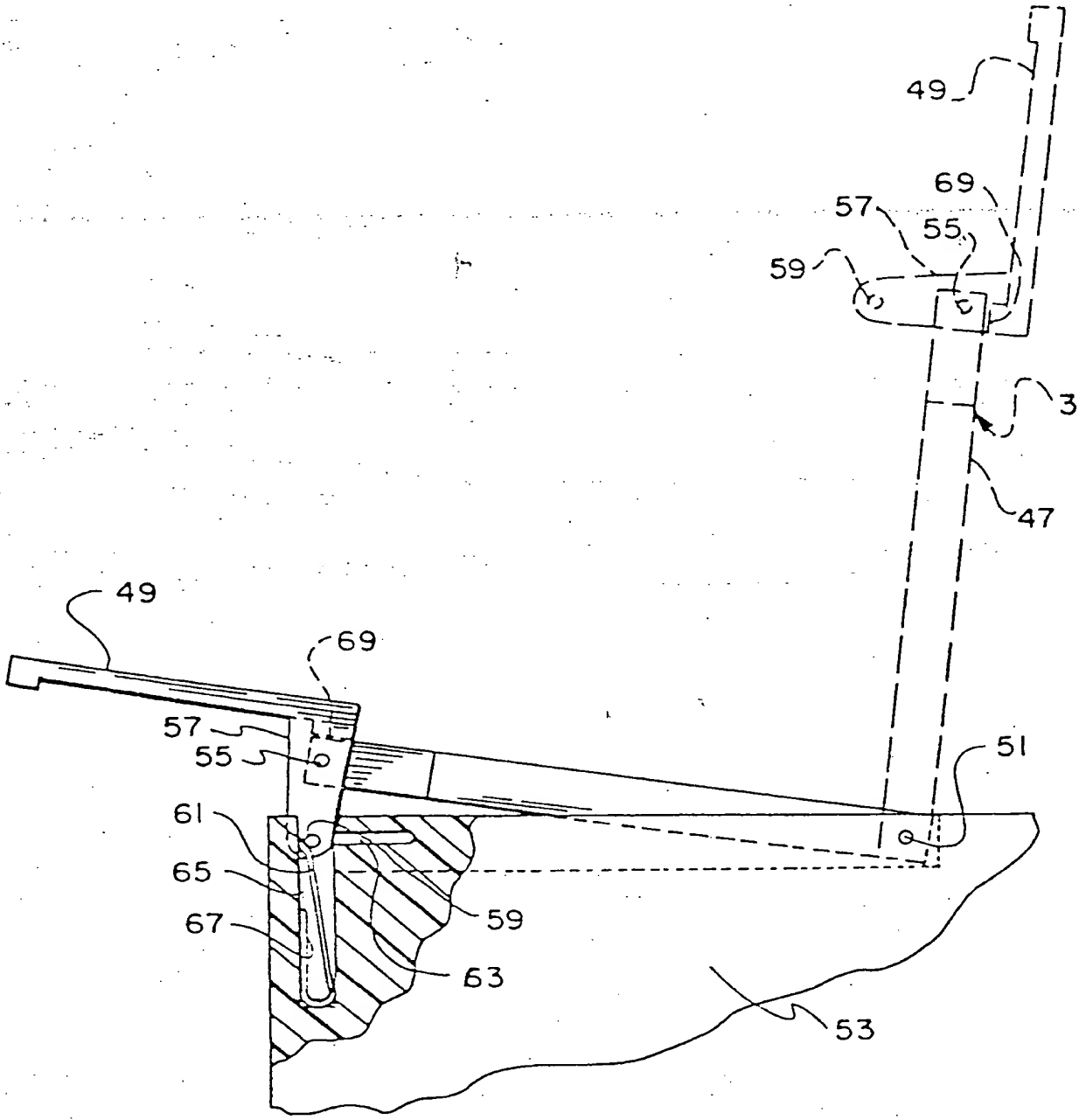

FIG.9